



## COURSE OUTLINE: ELR824 - INSTALL.METHODS 3

Prepared: R. Allen

Approved: Corey Meunier, Chair, Technology and Skilled Trades

<b>Course Code: Title</b>	ELR824: INSTALLATION METHODS - LEVEL 3
<b>Program Number: Name</b>	6522: CONST & MTCE ELE ADV
<b>Department:</b>	ELEC. APPRENTICES
<b>Semesters/Terms:</b>	20W, 19W, 18W
<b>Course Description:</b>	The student will develop an understanding of the hardware and software associated with the Allen Bradley ControlLogix 5000 family PLCs. PLC programming techniques using RSLogix 5000 software will be used to design, document and commission basic to intermediate PLC lab assignments.
<b>Total Credits:</b>	8
<b>Hours/Week:</b>	4
<b>Total Hours:</b>	40
<b>Prerequisites:</b>	There are no pre-requisites for this course.
<b>Corequisites:</b>	There are no co-requisites for this course.
<b>Essential Employability Skills (EES) addressed in this course:</b>	EES 4 Apply a systematic approach to solve problems. EES 5 Use a variety of thinking skills to anticipate and solve problems. EES 6 Locate, select, organize, and document information using appropriate technology and information systems. EES 8 Show respect for the diverse opinions, values, belief systems, and contributions of others. EES 9 Interact with others in groups or teams that contribute to effective working relationships and the achievement of goals. EES 10 Manage the use of time and other resources to complete projects. EES 11 Take responsibility for ones own actions, decisions, and consequences.
<b>Course Evaluation:</b>	Passing Grade: 50%, D
<b>Other Course Evaluation &amp; Assessment Requirements:</b>	Lab demonstrations 45% Lab write-ups 45% Attendance and Participation 10%  Totals 100%  *The student must complete and demonstrate all labs in order to receive a passing grade for the lab demonstration portion of evaluation.  *The student must achieve a passing grade in both lab demonstrations and lab write-ups in order to achieve a passing grade for the course.



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Grade  
 Definition Grade Point Equivalent  
 A+ 90 - 100% 4.00  
 A 80 - 89%  
 B 70 - 79% 3.00  
 C 60 - 69% 2.00  
 D 50 - 59% 1.00  
 F (Fail) 49% and below 0.00

CR (Credit) Credit for diploma requirements has been awarded.  
 S Satisfactory achievement in field /clinical placement or non-graded subject area.  
 U Unsatisfactory achievement in field/clinical placement or non-graded subject area.  
 X A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course.  
 NR Grade not reported to Registrar's office.  
 W Student has withdrawn from the course without academic penalty.  
 Cell Phones turned off and put away during Practicals  
 Smart Watches removed and put away during practicals  
 If your Phone or Smart Watch rings during a practical a grade of zero will be issued for the exercise.

**Course Outcomes and Learning Objectives:**

<b>Course Outcome 1</b>	<b>Learning Objectives for Course Outcome 1</b>
Describe the function and basic operation of a PLC and understand the related terminology including numbering system.	<ul style="list-style-type: none"> <li>Describe the function of a PLC and state its applications</li> <li>State the major advantages of a typical programmable logic controller(PLC) over conventional hardware relay systems</li> <li>Identify the four major components of a typical PLC and describe the functions of each</li> <li>Identify the two distinct types of memory</li> <li>Understand decimal, binary, octal, hexadecimal, binary coded decimal (BCD) numbering systems</li> <li>Perform conversions from one system to another</li> </ul>
<b>Course Outcome 2</b>	<b>Learning Objectives for Course Outcome 2</b>
Understand the I/O addressing and hardwiring requirements.	<ul style="list-style-type: none"> <li>Define the term discrete and the term analog</li> <li>Describe the I/O section of a PLC</li> <li>Define the term interposing relay</li> <li>Define the term optical isolation</li> <li>Understand the concept of base and alias tags</li> <li>Relate the I/O addressing to physical location</li> <li>Describe the proper wiring connections for input/output devices and their corresponding modules</li> <li>Describe how basic AC and DC input and output modules work and create a wiring diagram</li> </ul>
<b>Course Outcome 3</b>	<b>Learning Objectives for Course Outcome 3</b>
Develop and demonstrate basic programming techniques for AB ControlLogix 5000 PLC's using RSLogix 5000 Software.	<ul style="list-style-type: none"> <li>Describe basic programming techniques</li> <li>Understand the Examine ON, OFF, timers, counters, move, limit test, sequencers and internal storage instructions</li> <li>Describe the Force On and Off features and hazards that could be associated with both</li> <li>Program basic PLC functions offline</li> <li>Program PLC's to control</li> <li>Hard-wire PLCs to field equipment and input/output cards</li> <li>Create documentation to add to a PLC program</li> </ul>



	<b>Course Outcome 4</b>	<b>Learning Objectives for Course Outcome 4</b>
	Demonstrate the ability to write basic PLC programs to control various electrical equipment in the lab and run the programs on a PLC.	<ul style="list-style-type: none"> <li>• Download a program to a PLC from a remote PC over Ethernet to a particular PLC in the Lab</li> <li>• Edit online programs</li> <li>• Upload a program to a PC from a PLC</li> <li>• Program basic PLC functions online</li> <li>• Program PLCs to control motors, traffic lights</li> <li>• Download a program to a local PLC and run a program</li> </ul>
	<b>Course Outcome 5</b>	<b>Learning Objectives for Course Outcome 5</b>
	Demonstrate the ability to connect PLCs to control various electrical equipment in the lab and run the programs in a PLC in the lab.	<ul style="list-style-type: none"> <li>• Hard-wire PLCs to field equipment and I/O cards</li> <li>• Hardwire PLCs to control motors and traffic lights</li> <li>• Troubleshoot PLC control systems</li> </ul>

**Date:** August 29, 2019

**Addendum:** Please refer to the course outline addendum on the Learning Management System for further information.